DEPARTMENT OF THE NAVY
HEADQUARTERS UNITED STATES MARINE CORPS
WASHINGTON, D.C. 20380-0001

IN REPLY REFER TO
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20 MAY 1987

From: Commandant of the Marine Corps

Subj: REQUIRED OPERATIONAL CAPABILITY (ROC NO. 213.3.5) FOR AMPHIBIOUS CONTINUOUS BREACH LAND MINE COUNTERMEASURE SYSTEM

Ref: (a) MCO 3900.4C

Encl: (1) ROC No. 213.3.5 for Amphibious Continuous Breach Land Mine Countermeasure System

1. In accordance with the procedures set forth in the reference, the ROC for Amphibious Continuous Breach Land Mine Countermeasure System is hereby established and promulgated.

2. The Commanding General, Marine Corps Development and Education Command (Director, Development Center), Quantico, Virginia, 22134, is the Marine Corps point of contact for any questions pertaining to this ROC and any development efforts pertaining thereto.

RAY "M" FRANKLIN
Major General U.S. Marine Corps
Deputy Chief of Staff for RD&S

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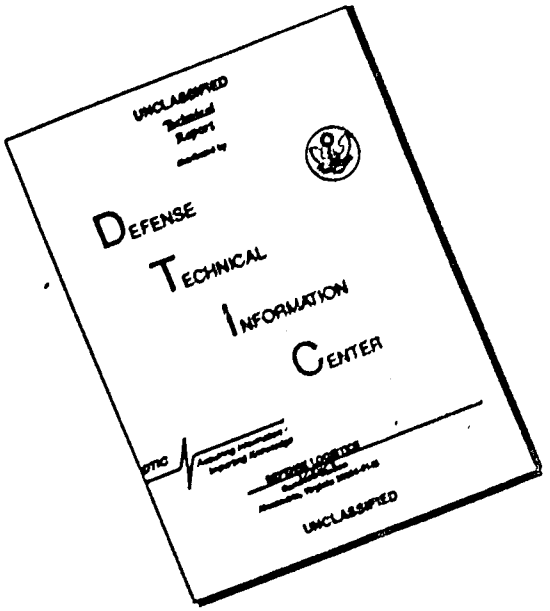

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PROPOSED REQUIRED OPERATIONAL CAPABILITY (ROC NO. 213.3.05) FOR AMPHIBIOUS CONTINUOUS BREACH LAND MINE COUNTERMEASURE SYSTEM

1. STATEMENT OF THE REQUIREMENT. The Marine Corps has a requirement for a mobile mine countermeasure system (hereafter referred to as "the system") capable of breaching enemy minefields in very shallow water and from the high watermark inland in conjunction with lead echelons of the amphibious assault. The system will be employed by assault amphibious vehicle (AAV) units to provide a highly mobile, quick response capability for the assault breaching of single impulse pressure and tilt-rod antitank and antipersonnel minefields. A preplanned product improvement (P3I) goal will be the neutralization of magnetically fuzed, blast hardened, and multiple impulse mines. The initial operational capability (IOC) for the system is FY91. The date for full operational capability (FOC) is scheduled for FY94.

2. THREAT AND OPERATIONAL DEFICIENCY

a. Threat. Potential enemy threats confronting Marine forces in the near-to-long-range period indicate extensive use of mine warfare threat forces and are contained in the Marine Corps Long Range Plan (MLRP) of 2 June 1982 and the Marine Corps Mid-Range Objective Plan (MMROP) of 8 November 1984.

(1) The threat makes extensive use of mines in all operations. To support its use of mines, the threat has continued to improve its mine warfare capabilities through material development and extensive training. The Marine Corps will encounter mines throughout the battle area during offensive, defensive and rear area operations. The threat considers mines to be effective in the offense. Threat mechanized divisions have the capability to emplace 36km of minefield obstacles in a 24-hour period. Minefields emplaced to support offensive operations normally have an antitank mine density of 750 mines per kilometer of front. Minefield depths normally vary from 80m to 300m.

(2) Threat use of mines in the defense is normally integrated into obstacle systems with mutually supporting strong points and fortified positions. Depending upon the time and material available, minefields used in the defense range from point obstacles to zones of obstacles and strong points extending for several kilometers.

(3) Threat mining operations include emplacement of mines in and around command, control, and logistic centers; on main supply routes; and (across) routes of advance. These are random mining operations designed to interdict, slow, and/or confuse enemy sustaining efforts.

(4) The proliferation of mines among third world forces, both in types and overall numbers, further reinforces the threat posed to Marine Corps forces by mine warfare in future conflicts.

(5) Detailed information concerning the threat posed by mine warfare to Marine Corps forces is contained in Land Mine Capabilities Current and Projected, Foreign (DST-1160S-008-82 of December 1982) and the MARCOR Land Mine Warfare Study (NCSC TR 376 82 of September 1982).

b. Operational Deficiency. Current and planned Marine Corps countermine weaponry does not possess a capability for the rapid, mobile breaching of land minefields by assault forces in very shallow water and from the high watermark inland. The current and planned future capability of the Marine Corps to breach minefields requires the employing vehicle to remain in an exposed stationary position for a minimum of 25 seconds. This allows the enemy to use direct and indirect fire to defeat the breaching effort. The ability to breach minefields rapidly while on-the-move is essential to sustain the mobility of the force and to reduce the loss of mine countermeasure vehicles by cover fire.

3. OPERATIONAL AND ORGANIZATIONAL CONCEPT

a. Operational Concept. The system will be employed from the AAV while stationary and on-the-move, afloat and ashore. Prior to the amphibious assault, the system components can either be stored in the cargo or magazine areas of an amphibious ship or installed within the designated AAV. Before launching the designated AAV, the system will be tested using its self-test capability; and subcomponents will be replaced as required. After launch from amphibious shipping, the AAV-mounted system will be employed by lead waves to hastily breach minefields in very shallow water and from the high water mark inland. The system can be used in conjunction with other land mine countermeasure systems during this period. During subsequent operations ashore, the system will be employed by AAV units either alone or in conjunction with existing and planned mechanical/explosive countermeasure systems and marking systems. Once the system has breached a lane, a vehicle with proofing and marking systems will traverse the lane, thus raising the probability of successful breaching.

b. Organizational Concept. The system will be a combined class V and VII item organic to AAV units. The explosive payload and associated storage container/launcher modules will be class V items and handled in accordance with normal ammunition management procedures. The fire control system and mounting assembly will be class VII equipment organic to the AAV battalion. The system will be distributed as follows:

UNIT	QUANTITY
Active Forces	
Assault Amphibian Bn (Marine Division)	36
SUB-TOTAL	36
Reserve Forces	
Assault Amphibian Bn (Marine Division)	12
SUB-TOTAL	12
Other	
Operational Readiness Float (ORF)	5
Maritime Prepositioned Ships (MPS)	~~12~~
Prepositioned War Reserve (PWR)	7
Training Requirements	2
Geoprepositioned Supplies (GPS)	3
SUB-TOTAL	29
TOTAL SYSTEMS	77

4. ESSENTIAL CHARACTERISTICS

a. Performance Characteristics. The system will:

(1) Be capable of clearing 95 percent (desired), 90 percent (required), of the single impulse pressure activated and tilt rod mines in a lane 20m (desired), 16m (required) wide by 300m (desired), 250m (required), long. Neutralization of magnetically fuzed, blast-hardened, and multiple impulse mines will be a P3I goal. This system can be used in conjunction with minefield proofing and marking systems to insure that follow-on vehicles will traverse the breached lane 98 percent of the time without damage from landmines. The P3I system will enable the breaching vehicle to proof and mark the breached lane to assure 98 percent success in traversing the minefield.

(2) Be capable of conducting the minefield breach at land speeds up to the cross country capability of the launch vehicle, but at least speeds of 15 mph (desired), 8 mph (required), and at afloat speeds up to 6 knots. The system must also be capable of operating while fully or intermittently stationary.

(3) Be capable of conducting the breaching mission while on the move within 60 seconds (desired), 90 seconds (required), and while stationary within 15 seconds (desired), 30 seconds (required).

(4) Be capable of breaching lanes in minimum depth increments of 15m.

(5) Provide the vehicle operator with a means of locating the entry point of the breached lane and a visual indication of the correct path to follow.

(6) Be capable of being employed while afloat in sea state 2 and while on land within the mobility parameters of the employing

vehicle. A P3I goal is to provide the full capability while operating in sea state 3 and while on land within the parameters of the employing vehicle.

(7) Be capable of being employed during day or night operations, in cross/head/tail winds up to 25 knots (desired), 15 knots (required), and under all climatic conditions identified in AR 70-38 to include rain, snow, fog, smoke, extreme temperatures, and salt water. The lowest operating temperature will be minus 25 degrees F.

(8) Be capable of employment without exposing the crew to enemy fire. The controls will be designed to be operated by personnel in full NBC/cold weather clothing.

b. Physical Characteristics. The system will:

(1) Have a self-test capability to enable the operator to conduct necessary pre/post operation checks.

(2) Not be permanently mounted or attached to the AAV and require only minor modifications to the vehicle for mounting.

(3) Not degrade the employing AAV's mobility, restrict the firing of the vehicle's weapons systems, interfere with its communications equipment, nor exceed the vehicle's structural integrity parameters.

(4) Have components capable of removal or installation by three Marines in 90 minutes (desired), 180 minutes (required), using theater-of-operations material handling equipment (MHE) such as the RT6000 or replacement extendable boom forklift.

(5) Not exceed 10,000 lbs (to include all subsystems, components, and interfaces). All major subsystems shall be of interchangeable, modular design.

(6) Be capable of transport (less employing vehicle) by fixed wing cargo aircraft (C-130) or helicopter (CH-53E) as well as naval amphibious shipping and common carriers. The system will have the necessary stressed tie down points to accommodate its internal transportation and external helicopter lift.

(7) Be compatible with the electrical system of the employing AAV.

(8) Have a minimum safe stand-off distance criteria for crew protection such that the crew/operator(s) will not be exposed to an incident over pressure greater than 1.8 psi* during employment of the system.

*Assumes a beta duration (defined in MIL-STD-1474) of pressure not greater than 120 milliseconds and personnel wearing both earplugs and earmuffs. If either earplugs or earmuffs (not both) are worn, the incident overpressure shall not exceed 0.8 psi.

(9) Keep environmental constraints such as temperature and toxic atmospheres within safe levels. The system will conform to MIL-STD-H-46855, Human Engineering Requirements for Military Systems, Equipment, and Facilities.

(10) Have an expendable material (class V) storage life of 12 years (desired), 10 years (required). The storage life for nonexpendable items (class VII) shall be at least 15 years (desired), 10 years (required).

(11) Have a nonexpendable material operational life of 2,000 hours (desired), 1,500 hours (required). Operational hours are defined as the time the equipment is installed on the AAV and the time an AAV participates in a minefield breaching mission, actual or training.

c. Maintenance Characteristics

(1) The system shall have a mean time to repair (MTTR) as follows:

		MTTR
Organizational Maintenance MOS (1833/2142)	Testing of System and Component Replacement	60 min
Intermediate Maintenance MOS (2142/2875)	Component Repair	4 hrs
Depot Maintenance	Component System Rebuild	60 hrs

(2) The maintenance ratio (MR) for the system shall not exceed 0.08 for organizational and intermediate level maintenance. MR is the ratio of the number of maintenance hours to the number of operating hours.

d. Priority Characteristics

(1) Performance. Stated operational (mission) performance characteristics have highest priority.

(2) Reliability. The mean time between mission critical failures (MTBMCF) for a 2.5 hour mission shall be 50 hours (desired), 25 hours (required). A mission critical failure is a failure of the system which cannot be corrected by the operator in 15 minutes that would prevent it from completing its mission.

(3) Availability. The system shall have an achieved availability (A2) of 0.93. A2 is defined by the following calculation:

$$A2 = \frac{\text{Total operating time}}{\text{Total operating time + total maintenance time}}$$

(4) Durability. The system shall be sufficiently rugged in design to withstand combat use without requiring major overhaul or replacement for 20 minefield breaching missions.

(5) Maintainability. The demonstrated maintainbility for scheduled and unscheduled maintenance (exclusive of daily operator services and inspections, and man hours for off-system repair of replaced components) must not exceed an average of .40 maintenance man-hours per hour of operation.

(6) Transportability. The system will:

(a) Meet all the criteria contained in the current edition of Air Force Command (AFSC) Design Handbook 1-11 for transport in C-5, C-130, and C-141 aircraft.

(b) Be capable of transport by rail.

(c) Be equipped with lifting and tie-down devices for air, rail, and water shipment in accordance with Army Regulation (AR) 70-47 and MIL-STD-209.

(d) Be helicopter transportable by CH-53E.

(7) Weight. Gross system weight will not exceed 10,000 pounds.

5. INTRA/INTEROPERABILITY & STANDARDIZATION REQUIREMENTS. The primary function of the system will be to breach enemy mine fields while the employing vehicle is moving, thereby exploiting the high mobility of the assault forces. System development will be a unilateral Marine Corps program to satisfy compatibility and operational requirements of Marine Corps amphibious assault and tactical vehicles. No special interservice or NATO standardization of system or system components is required. Implementation will result in a significant increase in the mission success rate within the Land Mine Warfare (214), Close Combat (211), and Amphibious Warfare (235) Mission Areas.

6. RELATED EFFORT. The Army has published a Proposed ROC for a Surface Launched Unit Fuel Air Explosive Mine Neutralization System (SLUFAE), TRADOCACN 20353. This system is not compatible with Marine Corps amphibious assault and tactical vehicles, does not provide a breaching capability starting at the high watermark, and does not meet Marine Corps stated requirements.

7. TECHNICAL FEASIBILITY AND ENERGY EFFECTIVENESS IMPACT

a. Technical Feasibility. The risk of achieving the desired capability depends on the environmental extremes included in the mission profile. The risks are low to moderate for developing this capability for land operations with moderate

terrain variations and wind conditions. The risks increase as terrain variations and wind velocities increase and as operations afloat and in the surf are included in the operating spectrum. The technical risk associated with achieving a significant improvement over the existing capability is acceptable and can be addressed by design selection and an orderly development process. The technical risk associated with achieving the operational requirement is moderate.

b. Energy Effectiveness Impact. This system will not adversely affect the consumption of energy critical materials.

8. LIFE CYCLE COST FORECAST. The funding profile for the system is divided into two categories: the system (including round) and the round. The funding profile for the budget submission of the system (including round) and the round is depicted in annex A. The life cycle cost estimate with assumptions and justifications is provided in annex B.

9. MANPOWER REQUIREMENTS. There will be no additional personnel or special MOS's required by introducing the system into the force structure. The system will be employed by Marines with MOS 1833 within the assault amphibian units. The system will be maintained by Marines with MOS's 2142 and 2875. There will be no increase in the authorized structure ceilings for occupational field 18. There will also be no change to overall manpower structure requirements. Assembly, employment, and maintenance of the system will be conducted by personnel of the MOS's listed in paragraph 4c(1).

10. TRAINING REQUIREMENTS. Training for the installation, operation, and maintenance of the system will require an estimated 20-hour increase in the training conducted at the Amphibious Vehicle Crewman School. Operator and maintenance training for the system will be incorporated into existing courses of instruction at the Marine Corps Basic Assault Amphibious Vehicle Crewman's Course at Schools Battalion, Camp Pendleton, California. Based on preliminary training estimates, a small increase in the length of the course will be required. Specific times required to lengthen existing courses of instruction, as well as the need for additional instructor personnel, will require additional analysis.

11. AMPHIBIOUS/STRATEGIC LIFT IMPACT. The system will have minimal impact on amphibious/strategic lift requirements while mounted in the host vehicle; however, troop lift capability in the ship-to-shore movement and subsequent operations ashore will be significantly reduced. Resolution of this problem must be addressed as part of this development program in concert with other programs that impact the AAV. Additionally, the round will have a major impact on amphibious/strategic lift requirements. The round is a hazardous ordnance type, requiring special certification. Attention should be addressed to the compatibility of the round with other ammunition items.

LIFE CYCLE COST ESTIMATE INPUT DATA FOR Amphibious Breach Land Mine Countermeasure System, RUN ON [illegible]
ESCALATION TABLES

Date: 11-04-1986

Reserve Funds: Y

Name of Major System: Amphibious Breach Land Mine Countermeasure System

FUNDING PROFILE INPUT:

	Pre-FY85	FY 86	FY 87	FY 88	FY 89	FY 90	FY 91	FY 92	To Comp
Qtys for CATFAE Launcher System:	0	0	0	0	0	12	24	24	[illegible]
Qtys for CATFAE Fire Control System:	0	0	0	0	0	12	24	24	[illegible]

END ITEM DOLLAR AMOUNTS:

RDT&E CB 86 $	16,073	10,917	11,134	13,831	6,679	10,061	2,440	500
PMC CB 86 $	0	0	0	0	0	8,713	17,426	17,426

SUPPORT DOLLAR AMOUNTS:

Support PMC CB 86 $	0	0	0	0	0	0	829	2,487
MILCON CB 87 $	0	0	0	0	0	0	0	0
O&MMC CB 86 $	0	0	0	0	0	0	38	114
OSMMCR CB 86 $	0	0	0	0	0	0	8	25
MPMC CB 86 $	0	0	0	0	0	0	20	60
RPMC CB 86 $	0	0	0	0	0	0	6	19

RDT&E (in THOUSANDS): 71635 Type of dollar: CB 86

Unit price of CATFAE Launcher System (in DOLLARS): 457426.2 Type of dollar: CB 86

Unit price of CATFAE Fire Control System (in DOLLARS): 268647.1 Type of dollar: CB 86

Initial provisioning/spares/parts (in THOUSANDS): 223.9 Type of dollar: CB 86

Gov't furn/added eqpt (in THOUSANDS): No funds.

Other direct system costs (in THOUSANDS): No funds.

1st & 2nd dest. transp. charges (in THOUSANDS): 456.225 Type of dollar: CB 86

PMC Ammunition (in THOUSANDS): 101108.1 Type of dollar: CB 86

ANNEX A

M&TCV (in THOUSANDS): No funds.

Guided Missiles (in THOUSANDS): No funds.

Comm Elec Eqpt (in THOUSANDS): No funds.

Support Vehicles (in THOUSANDS): No funds.

Engr & Other Eqpt (in THOUSANDS): No funds.

MI Con (in THOUSANDS): No funds.

System life cycle: 20 years.

SUBSYSTEM 1: CATFAE Launcher System

O&S PHASE for CATFAE Launcher System

Operational end items: 38

Operating hours per year per system: 75

Operators per system (not dedicated):

Number of operators needed:		
	E-1 - E-5:	.06
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Training for E-1 - E-5 operators: 2 weeks.

Enlisted operator turnover time: 3 years.

Material consumption per year per system (in DOLLARS): No funds.

Training ammunition consumption (in DOLLARS): No funds.

No energy consumption.

ORGANIZATIONAL MAINTENANCE for CATFAE Launcher System

No dedicated personnel for organizational maintenance.

MTBF(O): 12.5 hours.

MTBPM(O): 4 hours.

Mean time for org. repair (man hours):		
	E-1 - E-5:	2
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Mean time to perform prev. maint. (man-hrs):		
	E-1 - E-5:	2
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Training for E-1 - E-5 organizational maintenance personnel: 2 weeks.

Enlisted org maint pers turnover time: 3 years.

Average material cost per org. prev. maint. action (in DOLLARS): 10 Type of dollar: CB 86

Avg mat cost per org. repair action (in DOLLARS): 100 Type of dollar: CB 86

Other org. maint. costs per system per year (in DOLLARS): 139.85 Type of dollar: CB 86

INTERMEDIATE MAINTENANCE for CATFAE Launcher System

MTBF(I): 50 hours.

Mean time for an int. repair (man-hrs):

E-1 - E-5:	2
E-6 - E-9:	0
W-1 - O-3:	0
O-4 up :	0

No intermediate level preventive maintenance actions.

Training for E-1 - E-5 intermediate maintenance personnel: 2 weeks.

Enlisted int. maint. personnel turnover time: 3 years.

Avg mat. cost per int. repair action (in DOLLARS): 250 Type of dollar: CB 86

Other int. maint. costs (in DOLLARS): 29.91 Type of dollar: CB 86

DEPOT-LEVEL REPAIRS for CATFAE Launcher System

No depot repairs for the system.

OVERHAULS for CATFAE Launcher System

Number of overhauls per system: 1

Avg man-hours for depot overhaul: 120

Material cost per overhaul (IN DOLLARS): 25000 Type of dollar: CB 86

Weight of the system: 3800 lbs.

Losses: .0519481 %

Cost per year for contracted software maintenance (in DOLLARS): No funds.

No software maintenance for this system.

Storage: 81 square feet. Inside, unheated.

SUBSYSTEM 2 : CATFAE Fire Control System

O&S PHASE for CATFAE Fire Control System

Operational end items: 38

Operating hours per year per system: 75

Operators per system (not dedicated).

Number of operators needed:		
	E-1 - E-5:	.06
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Training for E-1 - E-5 operators: 2 weeks.

Enlisted operator turnover time: 3 years.

Material consumption per year per system (in DOLLARS): 10 Type of dollar: CB 86

Training ammunition consumption (in DOLLARS): No funds.

No energy consumption.

ORGANIZATIONAL MAINTENANCE for CATFAE Fire Control System

No dedicated personnel for organizational maintenance.

MTBF(O): 250 hours.

MTBPM(O): N/A

Mean time for org. repair (man-hours):		
	E-1 - E-5:	2
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Mean time to perform prev. maint. (man-hrs):		
	E-1 - E-5:	2
	E-6 - E-9:	0
	W-1 - O-3:	0
	O-4 up :	0

Training for E-1 - E-5 organizational maintenance personnel: 2 weeks.

Enlisted org maint pers turnover time: 3 years.

Average material cost per org. prev. maint. action (in DOLLARS): 10 Type of dollar: CB 86

Avg mat cost per org. repair action (in DOLLARS): 500 Type of dollar: CB 86

Other org. maint. costs per system per year (in DOLLARS): 19.19 Type of dollar: CB 86

INTERMEDIATE MAINTENANCE for CATFAE Fire Control System

MTBF(I): 250 hours.

Mean time for an int. repair (man-hrs):		
	E-1 - E-5:	2
	E-6 - E-9:	0

W-1 - O-3: 0
O-4 up : 0

No intermediate level preventive maintenance actions.

Training for E-1 - E-5 intermediate maintenance personnel: 2 weeks.

Enlisted int. maint. personnel turnover time: 3 years.

Avg mat. cost per int. repair action (in DOLLARS): 500 Type of dollar: CB 86

Other int. maint. costs (in DOLLARS): 29.91 Type of dollar: CB 86

DEPOT-LEVEL REPAIRS for CATFAE Fire Control System

Mean time between depot repairs: 500 hours.

Mean time to repair, depot level: 8 hours.

Material cost per repair, depot level (in DOLLARS): 5000 Type of dollar: CB 86

Weight of the system/subsystem: 2200 lbs.

OVERHAULS for CATFAE Fire Control System

No overhauls.

Weight of the system: 6000 lbs.

Losses: .0519481 %

Software maintenance for this system will be performed by both contractor and government personnel.

Cost per year for contracted software maintenance (in DOLLARS): 50000 Type of dollar: CB 86

Man-years per year required for software maintenance: .015

Percentage of maintenance done by military personnel: 50 %

Percentage of maintenance done by civilians: 50 %

Storage: 10 cubic feet. Inside, heated.

RESERVES for Amphibious Breach Land Mine Countermeasure System

Life cycle for reserve equipment: 20 years.

Number of items used in reserves for CATFAE Launcher System: 12

Operating hours per year per item for reserves for CATFAE Fire Control System: 75

Number of items used in reserves for CATFAE Fire Control System: 12

Major System: Amphibious Breach Land Mine Countermeasure System

Date: 11-04-1986

LIFE CYCLE COST FORECAST

FUNDING PROFILE
In Thousands of FY87 Constant Budget Dollars
(FYDP Dollars in Parentheses)
(1 Oct 85 Escalators)

20 YEAR LIFE CYCLE

	PRIOR YEARS	CURRENT YEAR	BUDGET YEAR	FY88	FY89	FY90	FY91	FY92	TO COMPL'N	TOTAL PROGRAM
Major System										
RDT&E	16,725	11,360	11,585	14,392	6,950	10,469	2,539	520	-0	74,539
FYDP Dollars		(10,917)	(11,585)	(14,941)	(7,471)	(11,636)	(2,917)	(618)		
PMC	0	0	0	0	0	9,135	18,271	18,271	13,177	58,854
FYDP Dollars		(0)	(0)	(0)	(0)	(10,421)	(21,764)	(22,726)		
QTYS FUNDED										
CATFAE Launcher System	0	0	0	0	0	12	24	24	17	77
CATFAE Fire Control System	0	0	0	0	0	12	24	24	17	77
Support										
Support PMC	0	0	0	0	0	0	869	2,608	102,930	106,408
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(1,036)	(3,244)		
MILCON	0	0	0	0	0	0	0	0	0	0
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(0)	(0)		
O&MMC	0	0	0	0	0	0	39	117	4,716	4,873
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(43)	(134)		
O&MMCR	0	0	0	0	0	0	9	26	1,031	1,065
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(10)	(30)		
MPMC	0	0	0	0	0	0	20	61	2,499	2,579
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(20)	(62)		
RPMC	0	0	0	0	0	0	6	19	789	814
FYDP Dollars		(0)	(0)	(0)	(0)	(0)	(7)	(20)		
NAVY PROC	0	0	0	0	0	0	0	0	0	0
TOTAL PROGRAM	16,725	11,360	11,585	14,392	6,950	19,604	21,754	21,622	125,142	249,133
FYDP Dollars		(10,917)	(11,585)	(14,941)	(7,471)	(22,057)	(25,797)	(26,833)		

TRAINING AMMUNITION: Funding for Training Ammunition is contained in the PMC Ammunition Line.

ANNEX B

Major System: Amphibious Breach Land Mine Countermeasure System Date: 11-04-1986

LIFE CYCLE COST ESTIMATE

(In Thousands of FY87 Constant Budget Dollars)

(1 Oct 85 Escalators)

20 YEAR LIFE CYCLE

PHASE/CATEGORY		SUBCATEGORY	CATEGORY	PHASE
I.	RDT&E PHASE			74,539
TRAINING AMMUNITION: Funding for Training Ammunition is contained in the PMC Ammunition Line.				
II.	INVESTMENT PHASE			165,336
1.	SYSTEM PRODUCTION/PROCUREMENT		59,324	
A.	Major End Item (Contractor)	58,619		
B.	Initial Provisioning/Spares, Repair Parts	235		
C.	Government Furnished/Added Equipment	0		
D.	Other Direct System Costs	470		
2.	SUPPORT EQUIPMENT PROCUREMENT		106,012	
A.	Ammunition	106,012		
B.	Weapons and Tracked Combat Vehicles	0		
C.	Guided Missiles	0		
D.	Comm-Elec Equipment	0		
E.	Support Vehicles	0		
F.	Engineer and Other Equipment	0		
3.	MILITARY CONSTRUCTION		0	
TRAINING AMMUNITION: Funding for Training Ammunition is contained in the PMC Ammunition Line.				
III.	OPERATIONS AND SUPPORT PHASE			9,258
1.	OPERATIONS		1,966	
A.	Operator Personnel/Training	1,955		
B.	Material Consumption	10		
C.	Energy Consumption	0		
2.	MAINTENANCE		6,729	
A.	Organizational Maintenance	2,184		
1)	Personnel/Training	1,056		
2)	Maintenance Material	193		
3)	Repair Material	772		
4)	Other	164		
B.	Intermediate Maintenance	645		
1)	Personnel/Training	43		
2)	Maintenance Material	0		
3)	Repair Material	540		
4)	Other	62		
C.	Depot Repair	849		
D.	Depot Overhaul	1,625		
E.	Unprogrammed Losses	395		
F.	Software Maintenance	1,029		
3.	INDIRECT SUPT, BASE OPS & MAINT, OTHER O/H COSTS		563	
A.	Base Operations	195		
B.	Other Overhead Costs	368		
4.	SUPPORT EQUIPMENT O&S		0	
TOTAL LIFE CYCLE COSTS				249,133

O&S PHASE--Reserves				1,975
1. OPERATIONS			472	
A. Operator Personnel/Training		469		
B. Material Consumption		2		
C. Energy Consumption		0		
2. MAINTENANCE			1,368	
A. Organizational Maintenance		524		
1) Personnel/Training	253			
2) Maintenance Material	46			
3) Repair Material	185			
4) Other	39			
B. Intermediate Maintenance		155		
1) Personnel/Training	10			
2) Maintenance Material	0			
3) Repair Material	130			
4) Other	15			
C. Depot Repair		204		
D. Depot Overhaul		390		
E. Unprogrammed Losses		95		
F. Software Maintenance		0		
3. INDIRECT SUPT, BASE OPS & MAINT, OTHER O/H COSTS			135	
A. Base Operations		47		
B. Other Overhead Costs		88		
4. SUPPORT EQUIPMENT O&S			0	

1. O&S PHASE--CATFAE Launcher System				3,945
1. OPERATIONS			743	
A. Operator Personnel/Training		743		
B. Material Consumption		0		
C. Energy Consumption		0		
2. MAINTENANCE			2,948	
A. Organizational Maintenance		1,179		
1) Personnel/Training	453			
2) Maintenance Material	147			
3) Repair Material	469			
4) Other	109			
B. Intermediate Maintenance		344		
1) Personnel/Training	27			
2) Maintenance Material	0			
3) Repair Material	293			
4) Other	23			
C. Depot Repair		0		
D. Depot Overhaul		1,235		
E. Unprogrammed Losses		189		
F. Software Maintenance		0		
3. INDIRECT SUPT, BASE OPS & MAINT, OTHER O/H COSTS			254	
A. Base Operations		107		
B. Other Overhead Costs		147		

2. O&S PHASE--CATFAE Fire Control System				3,338
1. OPERATIONS			751	
A. Operator Personnel/Training		743		
B. Material Consumption		8		
C. Energy Consumption		0		
2. MAINTENANCE			2,413	
A. Organizational Maintenance		481		
1) Personnel/Training	349			
2) Maintenance Material	0			
3) Repair Material	117			
4) Other	15			
B. Intermediate Maintenance		146		
1) Personnel/Training	5			
2) Maintenance Material	0			
3) Repair Material	117			
4) Other	23			
C. Depot Repair		645		
D. Depot Overhaul		0		
E. Unprogrammed Losses		111		
F. Software Maintenance		1,029		
3. INDIRECT SUPT, BASE OPS & MAINT, OTHER O/H COSTS			173	
A. Base Operations		41		
B. Other Overhead Costs		132		